



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,540	03/31/2004	Rahul N. Manepalli	884.C16US1	7165
21186	7590	08/23/2005	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			DANG, PHUC T	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/815,540

Applicant(s)

MANEPALLI ET AL.

Examiner

PHUC T. DANG

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on election filed on June 22, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 15-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 5, 8, 10, 11 and 14 is/are rejected.
- 7) ☒ Claim(s) 2-4, 6, 7, 9, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 2818

## **DETAILED ACTION**

### **Restriction/election**

1. Applicant's election without traverse of Group I (claims 1-14) filed on June 22, 2005, drawn to a method of forming a package and withdrawn Group II (claims 15-30).

Applicants have the right to file a divisional application covering the subject matter of the non-elected claims.

### **Drawings**

2. Drawings are objected to because of the following reasons:

The application has been filed with informal drawings which are acceptable for examination only. Formal drawings will be required when the application is allowed.

### **Specification**

3. The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### **Claim Rejections - 35 USC § 102**

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2818

4. Claims 1, 5, 8, 10-11 and 14 are rejected under 35 U.S.C. 102 (e) as being anticipated by Chiu (U.S. Publication No. US 2004/0124527 A1).

Regarding claims 1, 10-11 and 14, Chiu discloses a method of making a BGA package having a folded circuit device comprising:

supporting a die 120 on a flexible substrate 110;

encapsulating the die 120 with a die encapsulant 131

folding a flap 107 of the flexible substrate 110 over the die encapsulant 131;

introducing fold epoxy adhesive 132 between the folded flap 107 of the flexible substrate 110 and a surface of the die encapsulant 131; and

conforming the fold epoxy adhesive 132 to the surface such that the fold epoxy adhesive 132 is substantially flat [Fig. 1].

Regarding claim 5, Chiu discloses the fold adhesive is dispensed onto the die encapsulant before the flexible substrate is folded over the die encapsulant [see paragraph 0022].

Regarding claim 8, Chiu discloses a step further comprising supporting a top package upon the folded flap of the flexible substrate [Figs. 3-4].

#### **Allowable Subject Matter**

5. The following is a statement of reason for the indication of allowable subject matter:

Claims 2-4, 6-7, 9 and 12-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

Art Unit: 2818

None of the prior art made of record does not disclose a step of further comprising curing the fold adhesive wherein the fold adhesive has a volumetric cure shrinkage of less than about 0.8% as cited in claim 2 and a step of further comprising plasma cleaning to remove releasing agents on the surface of the die encapsulant and on a front side of the substrate before dispensing the fold adhesive as cited in claim 4 and providing solderjoints between the top package and a substantially flat upper surface of the folded flap of the flexible substrate; and maximizing reliability of the solder joints by transferring a substantial amount of stress from the solder joints to the fold adhesive, wherein the fold adhesive is substantially compliant due to a Young's modulus of less than about 600 Mpa at about room temperature, and an elongation at break greater than about 100% at about room temperature as cited in claim 9 and wherein the fold adhesive is selected from the group consisting of at least one of vinyl terminated silane, hydrogen terminated silane, platinum catalyst, fumed silica and other filler particles as cited in claim 12 and wherein the fold adhesive is selected from the group consisting of at least one of polyimide siloxane, aliphatic epoxy, phenol hardener, and imidazole catalyst as cited in claim 14.

Claims 3, and 6-7 are directly or indirectly depend on claim 2, then, they also would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

### **Conclusion**

6. Applicants are advised to cancel the non-elected claims of Group II (claims 15-30) upon response to the next Office action if the application is considered to be allowed.

Art Unit: 2818

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Heo'047 and Chiu'825 are cited interest.
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuc T. Dang whose telephone number is (571) 272-1776. The examiner can normally be reached on 8:00 am-5:00 pm.
9. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and After Final communications.
10. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Phuc T. Dang

PD



Primary Examiner

Art Unit 2818